

Docket No.: 059516-0058

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of	:	Customer Number: 20277
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Tao L. LOWE, et al.	:	Confirmation Number: 3378
	:	
Application No.: 10/807,510	:	Group Art Unit: 1618
	:	
Filed: March 24, 2004	:	Examiner: Blessing FUBARA
	:	
For: THERMORESPONSIVE AND BIODEGRADABLE MATERIALS AND USES THEREOF	:	

**DECLARATION OF TAO LU LOWE UNDER 37 C.F.R. §1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, TAO LU LOWE, declare as follows:

1. I am one of the named inventors on the above-captioned patent application directed to "Thermoresponsive and biodegradable materials and uses thereof". I have a Ph.D., in Polymer Chemistry from the University of Helsinki, Finland, and a postdoctoral research training in Chemical Engineering from the University of Wisconsin, Madison. I have more than fifteen years' experience in interdisciplinary areas of biomaterials, drug delivery, bionanotechnology, and regenerative medicine. I have 19 peer-reviewed articles published in the leading biomaterial or related journals, two book chapters published/in press, one book in development with the CRS Press, more than 100 oral and poster presentation at national and international conferences, 10 innovation awards, and 40 invited talks in academia, industry and international conference. All my published articles have been cited repeatedly with approval. The

impact of my research activities has been recognized in the Royal Society of Chemistry's magazine, Chemistry in Britain in 2003, the Association for Research in Vision and Ophthalmology 2007 Annual Meeting, and the Feature News of the Research Penn State Magazine in 2007. I am also a recipient of the Early Career Award in Translational Research from the Wallace H. Coulter Foundation in 2005. Currently I am a principle investigator for the funds awarded by the NIH, the Wallace H. Coulter Foundation and the Juvenile Diabetes Research Foundation. I serve as a peer reviewer for 20 refereed journals/book publishers, a panel member for the Degussa Outstanding Oral Drug Delivery Award of the Controlled Release Society Annual Meetings, and a grant reviewer for the NIH, ETH Zurich Research Commission, the U.S. Environmental Protection Agency, the Natural Sciences and Engineering Research Council of Canada, the U.S. Department of Education, the Alzheimers Association, the Juvenile Diabetes Research Foundation, and the NSF, et al. I have also served as a chair/co-chair for 21 drug delivery and tissue engineering related sessions at the American Institute of Chemical Engineers (AIChE) Annual Meetings, the Particles 2006 international conference, and the 2007 Biomedical Engineering Society Annual Meeting during the last five years. I also served as a 2009-2010 co-chair/chair for the Biomaterials Program of the AIChE society.

2. I am familiar with the prosecution of the above-captioned patent application and the statements made by the Examiner in Office Action mailed February 10, 2009 with respect to claims 1, 2, 4, 5, 6, 8, 9 and 16-24 being rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hennink et al., WO 98/00170 (WO '170) in view of Park U.S. 6,271,278 or Hennink U.S. 6,303,148 (Hennink '148); and the

rejection of claims 1, 2, 4, 5, 6, 8, 8 and 16-24 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Bos et al. "Hydrogels for the Controlled Release of Pharmaceutical Proteins" Pharmaceutical Technology. Oct., 2001.

3. A person having ordinary skill in the art would not have found it obvious to replace HEMA as disclosed in Hennink '170 with the poly N-isopropylacrylamide as disclosed in Park and Hennink '148 because the present composition recited in claim 1 – "a polymeric material comprising a smart segment and a biodegradable segment, wherein the biodegradable segment includes a hydrophobic segment and a hydrophilic segment, wherein the smart segment comprises poly(N-isopropylacrylamide), poly(N-alkylacrylamide), poly(N-n-propylacrylamide), poly(N-isopropylmethacrylamide), poly(ethylene oxide)-poly(propylene oxide)-poly(ethylene oxide), or elastin-like polypeptides," achieves unexpectedly improved results.

4. It would not have been obvious to a person having ordinary skill in the art, based on the disclosure in Bos, to achieve the present polymeric composition because the present composition of claim 1 achieves unexpectedly improved results.

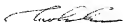
5. Unexpected results for the recited composition is clearly shown, for example in FIG. 10 of the present disclosure, in which the polymeric material having the composition as recited in claim 1, (NIPAAm-Dextran derivative) at 37°C has a Bovine Serum Albumin "BSA" (molecular weight of 69.4 kDa) release time of over 15 days. In contrast, as shown in Hennink FIG. 5, the release time of the much larger molecule Immunoglobulin G "IgG" (molecular weight of 150kDa) at 37°C from the HEMA polymer of Hennink '170 shows a maximum release time of 6 days. A person have ordinary skill in the art would have expected a larger molecule, such as IgG to have a longer release

rate than a comparatively smaller molecule BSA. However, the release rate from the presently claimed composition is unexpectedly improved compared to the composition disclosed in Hennink '170. Therefore, the current subject matter achieves unexpectedly improved results.

6. Unexpected results for the recited composition is also clearly shown, for example, in FIG. 3 of the present disclosure, in which the polymeric material as recited in claim 1, achieves a sustained swelling ratio for up to 8 months. In contrast, the swelling ratio of the HEMA polymer disclosed in Hennink '170, as shown in FIG. 4 of Hennink '170 shows a rapid drop in swelling ratio after less than 22 days. Therefore, the current subject matter achieves unexpectedly improved results

7. I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Signed this 09 day of June, 2009.



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**Tao Lu Lowe Ph.D.**